



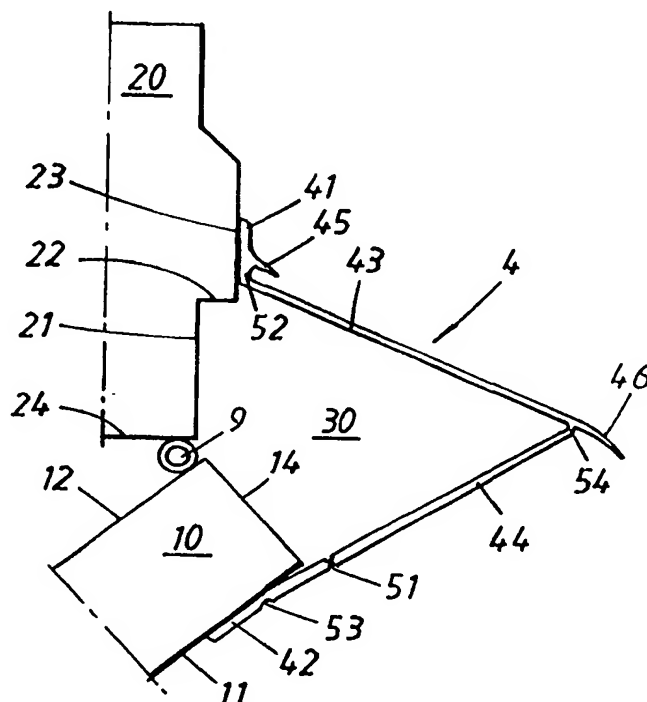
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>E06B 7/00 // 3/88</b>		<b>A1</b>	(11) International Publication Number: <b>WO 98/19037</b>
			(43) International Publication Date: 7 May 1998 (07.05.98)
(21) International Application Number: PCT/SE97/01683 (22) International Filing Date: 8 October 1997 (08.10.97) (30) Priority Data: 9603950-8                      29 October 1996 (29.10.96)                      SE (71)(72) Applicant and Inventor: HELLSTRÖM, Björn [SE/SE]; Näsvägen 4, S-132 36 Saltsjö-Boo (SE). (74) Agents: SUNDSTRÖM, Per et al.; Stenhagen Patentbyrå AB, P.O. Box 4630, S-116 91 Stockholm (SE).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>	

(54) Title: A PROTECTION STRIP

## (57) Abstract

A protection strip for shielding a pinching or squeezing risk-area (30) between a rear narrow edge (14) of a door (10) and a door frame (20) on which the door is hinged by means of hinges (9) comprises an extruded strip that includes two edge-parts (41, 42) which form attachment legs for attachment of the strip (4) to the door frame (20) and the door (10) respectively. Located between these legs are two legs (43, 44) which are hinged together and to a respective leg (41, 42). A biasing tongue (45) on one attachment leg (41) functions to bias the strip towards the adjacent main surface (11) of the door (10) when the door is closed. The biasing tongue (45) facilitates mounting of the strip, so that the strip will lie against the main surface of the door when the door is closed, along the full length of the strip.



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**A PROTECTION STRIP**

The present invention relates to a protection strip of the kind defined in the preamble of Claim 1.

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The invention thus relates to a protection strip which is intended to bridge a so-called pinching or squeezing risk-area between a narrow edge of a door and a door frame on which the door is hinged, wherein the hinge lies adjacent to or in front of one main surface of the door.

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Known protection strips intended for this purpose are comprised basically of a profiled device that includes a plurality of mutually parallel profiled parts or legs that can be folded relative to one another. The profiled device therewith includes on each edge of the device an attachment leg by means of which the profiled device can be fastened to the main surface of the door and to the door frame respectively. The profiled device also includes a third and a fourth leg which are hingedly connected at one edge thereof and also hingedly connected to a respective attachment leg at their other edges. The actual protection strip is fitted so that when the door is closed the strip will hold the third and the fourth legs at an essentially constant angle to the adjacent main surface of the door. The first attachment leg connects with the frame and the third leg connects between the first attachment leg and the fourth leg.

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These known protection strips are difficult to mount correctly, i.e. so that the hinged joints between the third

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and the fourth leg lie against the main surface of the door when the door is closed. The reason for this is because the third and the fourth legs have a relatively large width, whereas the mounting distance between the first and the second attachment legs is relatively small. This means that the slightest deviation in the mounting distance between the attachment legs (when the door is closed) will result in a relatively large change in the alignment of the third leg. Consequently, the distance of the hinged connection of the third leg to the fourth leg from the main surface of the door will vary along the full length of the protection strip.

Accordingly, one object of the invention is to provide a construction that facilitates mounting of the protection strip such as to ensure that the connection region between the third and the fourth leg will lie at a generally constant distance from the main surface of the door along the full length of the protection strip.

This object is achieved with a protection strip defined in the accompanying Claim 1.

Further embodiments of the invention are set forth in the accompanying dependent Claims.

One essential feature of the inventive protection strip is that the first attachment leg has a biasing tongue which when the door is closed, functions to bias the third leg (and thereby also the fourth leg) in a direction towards the adjacent main surface of the door.

This biasing tongue enables the fitter to easily ensure correct fitting of the protection strip, such that the hinge connection between the third and the fourth leg lies against the door along the full length of the strip.

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The invention will now be described in more detail with reference to exemplifying embodiments thereof and also with reference to the accompanying drawings.

10 Fig. 1 is a schematic horizontal sectioned view through the region in which a door frame and a door connect, and shows a protection strip that bridges the pinching or squeezing risk-area therebetween.

15 Fig. 2 illustrates part of the door shown in Fig. 1 in a closed state.

Fig. 3 illustrates one embodiment of the attachment of a biasing tongue in one attachment leg of the strip.

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Fig. 4 illustrates part of a hinge between two strip legs.

As will be evident from Figs. 1 and 2, a door 10 is hingedly connected to a door frame 20 by means of a hinge 9, wherein  
25 the hinge axle 9 is suitably located at or outwardly of the front plane 24 of the door frame and in or outwardly of the outer main plane 12 of the door 10. The door frame 20 has a recess 21, 22 which receives the rear narrow edge-part 14 of the door 10 when the door is closed. Located between the  
30 rear narrow edge 14 of the door 10 and the recess 21, 22 in the door frame 20 is a pinching or squeezing risk-area 30.

For instance, the fingers of a child can easily be pinched or squeezed in this area between the rear narrow edge 14 of the door and the recesses 21, 22 in the door frame 20. This area 30 is shielded by a protection strip 4.

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The strip 4 will conveniently have the form of an extruded profiled device comprised of springy, elastic plastic, said profiled device basically comprising two attachment legs 41, 52 intended for attachment to the inside surface 23 of the door frame 20 outwardly of the recess 21, 22, and to the inner main surface 11 of the door 10 adjacent its rear narrow edge 14, wherein the attachment leg 42 will, of course, be spaced from the rear narrow edge 14 of the door blade 10 such as to be located inwardly of the free inner surface 23 of the door frame 20, outside the recess 21, 22, when the door is closed.

One long leg 43 of the profiled device is hingedly connected to the attachment leg 41 by means of a hinge joint 52, while another long leg 44 of said device is connected to the attachment leg 42 by means of a hinge joint 53. The two legs 43, 44 are connected to one another by means of a hinge joint 54.

The leg 44 also includes a hinge 51 whose distance from the hinge 53 exceeds the distance between the hinge 53 and the rear narrow edge-surface 14 of the door 10. The combined length of the legs 44, 43 exceeds the greatest distance between the attachment legs 41, 42 fitted to the door frame and door respectively, such that the interior angle between the legs 43, 44 will always be smaller than 180° in the case

of embodiments which lack means for preventing the legs from being folded out in "wrong directions". The lip 46 forms such means in the illustrated embodiment.

- 5 The recess in the door frame 20 has a bottom surface 21 and a side surface 22 which define the depth  $x$  of the recess from the inner surface 23 of the door frame.

- 10 The leg 43 has an extension lip 46 which extends beyond the hinge connection 54. The free edge-part of the lip 46 is intended to press firmly and resiliently against the inner main-surface 11 of the door 10 when the door is closed (c.f. Fig. 2).

- 15 The protective strip 4 may be supplied with the base or foot surfaces of the flanges or legs 41, 42 provided with double-sided adhesive tape 47, 48 which is protected initially with release paper (not shown). It will be obvious, however, that the flanges 41, 42 can be secured with nails, screws or like  
20 fasteners.

- One particularly important feature of the invention resides in the provision of a springy, elastic biasing tongue 45 on the first attachment flange 10, said tongue being arranged  
25 and designed to cause the leg 43 to swing about the hinge 52 in a direction towards the surface 11 of the door 10 when the door is closed.

- An essential advantage provided by the inventive protection  
30 strip is associated with mounting of the strip:

The inventive biasing tongue 45 enables the fitter to mount the attachment legs 41, 42 on the surface 23 of the door frame and on the surface 11 of the door respectively, in the vicinity of the corner angle therebetween, as shown in Fig. 2, wherewith the biasing tongue 45 ensures that the leg 43 will swing clockwise about the hinge 52, such as to bring the lip 46 into contact with the door surface 11 along the full length of the strip 4, irrespective of minor variations in distance between the leg 41 and the door surface 11 and between the leg 42 and the surface 23. In the absence of the biasing lip 45, such variations in distance would very probably cause the distance between the legs 43 and 44 from the door surface 11 to vary along the length of the strip.

As will be seen from Fig. 2, the attachment leg 42 is bent back against the leg 44 when the door is closed, so as to enable the hinge 53 to be placed in the proximity of the hinge 52, and so as to enable the hinges 52, 53 to be placed in the proximity of the corner angle between the surface 23 of the door frame and the surface 11 of the door.

Fig. 3 shows an alternative embodiment in which the biasing tongue 45 is a separate element whose attachment end has an undercut part 64 which fits into an undercut groove 65 in the attachment leg 41. It will be seen that the exposed surface of the leg 41 is generally convex and has a number of mutually parallel, separate grooves 65 which define different angles with the mounting surface 47 of said leg. This embodiment enables the biasing force of the tongue 45 towards the leg 43 to be adapted, even when the angle that the surface 23 of the door frame defines with the surface of

the door when closed is different to the angle shown in Fig. 2.

It will be obvious that the inventive strip can be used alternatively with windows and like elements, where the "door" may include a transparent part.

In a further embodiment of the strip, the root or base of the tongue 45 may include a slot 49, on one side of the tongue, so as to enable the tongue 45 to exert its spring function against the leg 43 when the slot 49 is closed, while enabling the tongue to be folded down about the hinge part 50 formed between the bottom of the slot 49 and the opposite side of said slot, in a direction towards the leg 43, when the legs 43 and said foot or base part 41 lie in one and the same plane. This enables the strip to be easily rolled-up to form a roll, so that the strip can be sold in lengths that can be cut by the user into required lengths.

The hinge part 54 may alternatively be constructed in the manner shown in Fig. 4, such that the legs 43, 44 will include therebetween an angle which is always smaller than  $180^\circ$ , in order to prevent the hinge 54 knuckling over in the "wrong" direction. Fig. 4 shows that angle  $\alpha$  between the long axes 73, 74 of the legs 43, 44 is smaller than  $180^\circ$  when abutment surfaces 56, 57 disposed in the proximity of the hinge 54 are in contact with one another. The abutment surfaces can be provided by forming in the strip an undercut slot 55 which opens at the root-part of the lip 46 towards the side of the lip 46 that faces the leg 44. The remaining

part beneath the slot 55 forms an interlock that forms the hinge 54.

5 A plurality of hinge means 51' corresponding to the hinge means 51 may be provided at small distances from one another in the region between the hinge means 51 and 53. This enables any one of the hinge means 51' to correspond functionally to the hinge means 53 or the hinge means 51, so as to minimize tension and compression forces in the leg 44  
10 and the leg 43, and so that the lip 46 and the hinge means 54 can be brought to a correct position against the door 10 when the door is closed more easily.

## CLAIMS

1. A protection strip for shielding a pinching or squeezing risk-area (30) between a rear narrow edge (14) of a door (10) and a door frame (20) on which the door (10) is hinged by means of hinges (9), wherein the protection strip (4) includes a profiled element that has on each of its edge-parts an attachment leg (41, 42) for securing the strip (4) to one main-surface (11) of the door and to the door frame (20) respectively, a third leg (43) and a fourth leg (44) which are hingedly connected together at one edge (54) and which are also hinged to a respective attachment leg (41, 42) at edge-parts (52, 53), wherein the strip (4) functions to hold the third leg (43) and the fourth leg (44) at an essentially constant angle to said one main surface (11) of the door (11) along the length of the strip (4) when the door is closed, and wherein the first attachment leg (41) is connected to the door frame (20) and the third leg (43) is connected between the first attachment leg (41) and the fourth leg (44), **characterized** in that the first attachment leg (41) includes a biasing tongue (45) that biases the third leg (44) and the fourth leg (44) pivotally in a direction towards said one main surface (11) of said door.

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2. A strip according to Claim 1, **characterized** in that the third and the fourth legs (43, 44) include in their region (54) of mutual connection a sealing lip (46) whose free edge or end is adapted to lie against said one main surface (11) of the door when the door is closed.

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3. A strip according to Claim 1 or 2, **characterized** in that the fourth leg (44) includes between its ends a hinge means (51) that is spaced from the hinged connection (53) of the second attachment leg (42) by a distance that  
5 corresponds at least to the distance from the aforesaid hinged connection (53) of the adjacent narrow edge (14) of the door (10).

4. A strip according to any one of Claims 1-3,  
10 **characterized** in that the door frame (20) includes a recess (21, 22) that receives the rear narrow edge-part (14) of said door.

5. A strip according to any one of Claims 1-4,  
15 **characterized** in that the biasing tongue (45) is a separate element which has on its attachment end a means (64) for securing one of several fastener devices (65) on the first attachment leg (41), therewith enabling the biasing tongue to be fastened in different directions.

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6. A strip according to Claim 5, **characterized** in that the means (64) on the biasing tongue (45) has the form of an undercut part on the base of the tongue; and in that the fastener devices (65) on the anchoring leg comprise mutually  
25 parallel, undercut grooves (65) that are inclined at different angles relative to the abutment plane (41) of the anchoring leg.

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Fig. 1

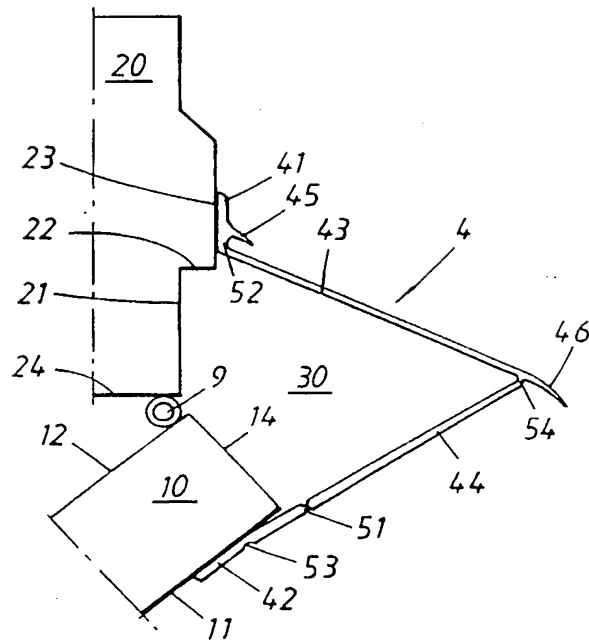


Fig. 2

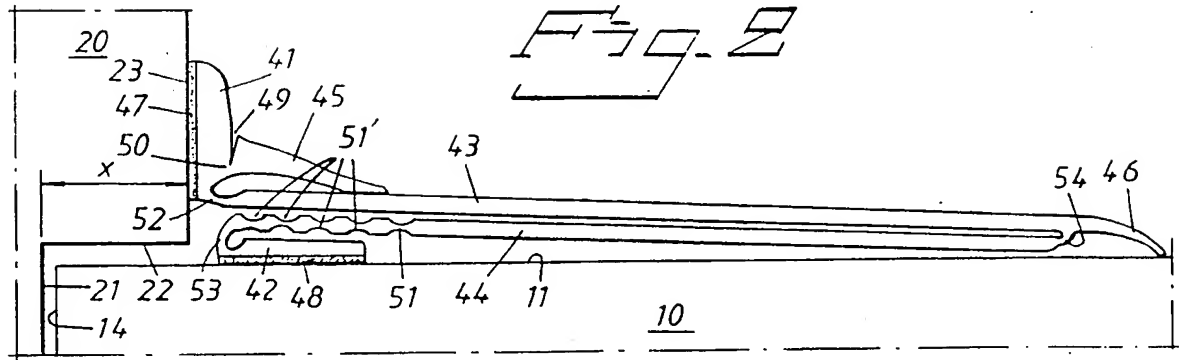
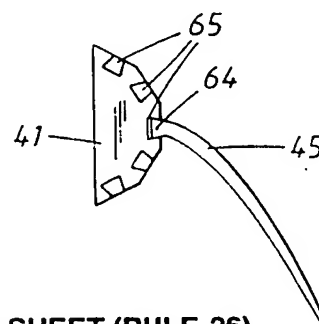


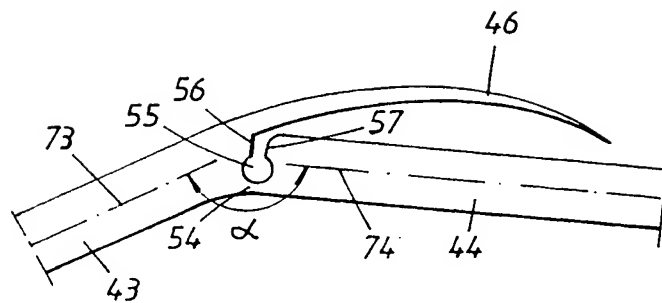
Fig. 3



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Fig. 4



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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 97/01683

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: E06B 7/00 // E06B 3/88

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## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: E06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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WPI, EPODOC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9318268 A1 (STECOL ENTERPRISES LIMITED), 16 Sept 1993 (16.09.93) --	1-6
A	US 5220708 A (C.L. LUCAS ET AL), 22 June 1993 (22.06.93) --	1-6
A	GB 2265929 A (P.L. MARCHINGTON), 13 October 1993 (13.10.93) --	1-6
A	GB 2218449 A (S. SWADDLE), 15 November 1989 (15.11.89) --	1-6

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Date of the actual completion of the international search

22 January 1998

Date of mailing of the international search report

09/02/1998

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	FR 2282032 A1 (IPPOLITO, M.), 12 March 1976 (12.03.76)  -- -----	1-6

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**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

07/01/98

International application No.  
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Patent document cited in search report			Publication date	Patent family member(s)	Publication date
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